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CLMPTO

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1. A digital broadcasting apparatus which achieves simulated interaction using a digital broadcast, the digital broadcasting apparatus comprising:

image information storage means for storing a plurality of sets of image data, each of which has an image data identifier;

control information storage means for storing a plurality of sets of control information, each of which has a control information identifier, and each of which includes link destination information that shows a set of image data and a set of control information for a link destination for a corresponding set of image data; and

transmission means for repeatedly transmitting a plurality of sets of the image data and a plurality of sets of the control information.

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2. A digital broadcasting apparatus which achieves simulated interaction using a digital broadcast, the digital broadcasting apparatus comprising:

image information storage means for storing a plurality of sets of image data, each of which has an image data identifier;

control information storage means for storing a plurality of sets of control information, each of which has a control information identifier, and each of which includes

link destination information that shows a set of image data and a set of control information for a link destination for a corresponding set of image data; and

multiplexing transmission means for repeatedly transmitting a plurality of sets of the image data and a plurality of sets of the control information as a multiplexed stream.

3. The digital broadcasting apparatus of Claim 2, further comprising correspondence information storage means for storing correspondence information showing correspondence between the sets of image data and the sets of control information,

wherein the multiplexing transmission means includes:

a retrieval unit for retrieving a set of image data and a corresponding set of control information shown in the correspondence information; and

a multiplexing unit for successively multiplexing image data and control information retrieved by the retrieval unit.

4. The digital broadcasting apparatus of Claim 3, wherein the link destination information shows a combination of an image data identifier of the set of the image data for the link destination and a control information identifier of a corresponding set of control information for the link

destination.

5. The digital broadcasting apparatus of Claim 4, wherein the multiplexing unit, when multiplexing a set of image data and a set of control information, assigns and writes first image data identification information into the set of image data and control information identification information into the set of control information.

6. The digital broadcasting apparatus of Claim 2, wherein at least one set of control information includes supplementary image information which is used to select a set of image data for a link destination indicated by the link destination information.

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7. The digital broadcasting apparatus of Claim 2, wherein at least one set of control information includes script information for supporting an interactive function performed by a reception apparatus which receives the digital broadcast.

8. The digital broadcasting apparatus of Claim 2, further comprising entry information storage means for storing entry information which shows a combination of a set of image data and a set of control information which are to be reproduced first for a program,

wherein the multiplexing transmission means repeatedly transmits the entry information.

9. A digital broadcasting apparatus which achieves simulated interaction using a digital broadcast, the digital broadcasting apparatus comprising:

image information storage means for storing a plurality of sets of image data, each of which has an image data identifier;

control information storage means for storing a plurality of sets of control information, each of which has a control information identifier, and each of which includes link destination information that shows a set of image data and a set of control information for a link destination for a corresponding set of image data, the link destination information showing a combination of an image data identifier of the set of the image data for the link destination and a control information identifier for the set of the control information;

correspondence information storage means for storing correspondence information showing correspondence between the sets of image data and the sets of control information; and

multiplexing transmission means for repeatedly transmitting a plurality of sets of the image data and a plurality of the control information as a multiplexed

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stream,

wherein the multiplexing transmission means includes:

a retrieval unit for retrieving a set of image data and a corresponding set of control information shown in the correspondence information;

a multiplexing unit for successively multiplexing image data and control information retrieved by the retrieval unit, in doing so assigning and writing first image data identification information into the set of image data and control information identification information into the set of control information,

an image correspondence table generation unit for generating an image correspondence table for each set of image data, each image correspondence table being given identification information found from the image data identifier of the corresponding set of image data, each image correspondence table including second image data identification information specifying a corresponding set of image data; and

an image correspondence table multiplexing unit for reading an image correspondence table corresponding to a set of image data and multiplexing the image correspondence table such that the image correspondence table will be transmitted by the multiplexing transmission means at a time which precedes a transmission of the corresponding set of image data by at least a predetermined time period, the

predetermined time period being defined as a time period which allows a digital broadcast reception apparatus which receives the digital broadcast to obtain the second image data identification information specifying a set of image data before starting to extract the corresponding set of image data.

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10. The digital broadcasting apparatus of Claim 9, wherein the multiplexing transmission means further includes:

a retrieval control unit for controlling the retrieval unit to retrieve at least one set of image data which has first image data identification information that differs from the image data specified by second image data identification information included in the image correspondence table, during a time period between a multiplexing of the image correspondence table into the multiplexed stream by the image correspondence table multiplexing unit and a multiplexing of the set of image data corresponding to the image correspondence table.

11. The digital broadcasting apparatus of Claim 10, wherein the multiplexing unit includes a null data generation unit for generating, when a number of sets of image data stored in the image information storage means is less than a predetermined number, a number of sets of null data to make up the predetermined number, wherein the multiplexing unit

successively multiplexes the sets of null data generated by the null data generation unit after a final set of image data and a final set of control information have been read by the retrieval unit.

12. The digital broadcasting apparatus of Claim 9, wherein the multiplexing unit further includes an area assigning unit for assigning, when a set of image data and a set of control information are multiplexed, a bit rate to the set of image data and to the corresponding set of control information, each bit rate being determined in accordance with a ratio of a data amount of each set of image data to an information amount of the corresponding set of control information,

wherein the multiplexing unit multiplexes the set of image data and the set of control information using the respective bit rates assigned by the area assigning unit.

13. The digital broadcasting apparatus of Claim 12, wherein the multiplexing unit further includes a multiplexing start position calculation unit for calculating multiplexing start positions for when an image correspondence table, a set of image data, and a set of control information are multiplexed, using a predetermined equation,

the image correspondence table multiplexing unit multiplexing an image correspondence table starting at the

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multiplexing start position calculated by the multiplexing start position calculation unit, and

the multiplexing unit multiplexing a set of image data and a set of control information at the respective multiplexing start positions calculated by the multiplexing start position calculation unit.

14.,The digital broadcasting apparatus of Claim 9, wherein the first image data identification information and the second image data identification information are the same.

15. The digital broadcasting apparatus of Claim 9, wherein the first image data identification information and the second image data identification information are combinations of a stream identifier ("stream_id") and a packet identifier ("PID") in accordance with MPEG2 (Moving Pictures Experts Group2) standard.

16. The digital broadcasting apparatus of Claim 9, wherein the first image data identification information is a combination of a stream identifier ("stream_id") and a packet identifier ("PID") in accordance with MPEG2 (Moving Pictures Experts Group2) standard, and the second image data identification information is a combination of a stream identifier in accordance with MPEG2 (Moving Pictures Experts Group2) standard and a component tag ("component_tag") in

accordance with DVB (Digital Video Broadcasting) standard,
wherein the multiplexing transmission means repeatedly
transmits a correspondence table for the packet identifier
and the component tag.

17. The digital broadcasting apparatus of Claim 9, wherein
the multiplexing transmission means further includes an
image data identifier appending unit for writing, when a set
of image data retrieved by the retrieval unit is
multiplexed, an image data identifier into a private area of
the corresponding set of image data.

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18. The digital broadcasting apparatus of Claim 9, wherein the image correspondence table multiplexing unit, after multiplexing an image correspondence table, multiplexes the same image correspondence table a plurality of times before a set of image data which corresponds to the image correspondence table is multiplexed.

19. A digital broadcasting apparatus which achieves simulated interaction using a digital broadcast, the digital broadcasting apparatus comprising:

- image information storage means for storing a plurality of sets of image data, each of which has an image data identifier;

- audio information storage means for storing a

plurality of sets of audio data, each of which has an audio data identifier;

control information storage means for storing a plurality of sets of control information, each of which has a control information identifier, and each of which includes link destination information that shows a set of image data, a set of audio data, and a set of control information for a link destination for the corresponding set of image data; and

multiplexing transmission means for repeatedly transmitting a plurality of sets of the image data, a plurality of sets of audio data, and a plurality of the control information as a multiplexed stream.

20. The digital broadcasting apparatus of Claim 19, further comprising:

correspondence information storage means for storing correspondence information showing correspondence between the sets of image data, the sets of audio data, and the sets of control information,

wherein the multiplexing transmission means includes:

a retrieval unit for retrieving a set of image data and a corresponding set of audio data and a corresponding set of control information shown in the correspondence information; and

a multiplexing unit for successively multiplexing image data, audio data and control information retrieved by the retrieval unit.

21. The digital broadcasting apparatus of Claim 20, wherein the link destination information shows a combination of an image data identifier for the set of image data of a link destination, an audio data identifier for the set of audio data of the link destination, and a control information identifier for the control information of the link destination.

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22. The digital broadcasting apparatus of Claim 4, wherein the multiplexing unit, when multiplexing a set of image data, a set of audio data, and a set of control information, assigns and writes first image data identification information into the set of image data, first audio data identification information into the set of audio data, and control information identification information into the set of control information.

23. The digital broadcasting apparatus of Claim 22, wherein the multiplexing transmission means further includes:

an image correspondence table generation unit for generating an image correspondence table for each set of image data, each image correspondence table being given identification information found from the image data

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identifier of the corresponding set of image data, each image correspondence table including second image data identification information specifying a corresponding set of image data; and

an audio correspondence table generation unit for generating an audio correspondence table for each set of audio data, each audio correspondence table being given identification information found from the audio data identifier of the corresponding set of audio data, each audio correspondence table including second audio data identification information specifying a corresponding set of audio data;

an image correspondence table multiplexing unit for reading an image correspondence table corresponding to a set of image data and multiplexing the image correspondence table such that the image correspondence table will be transmitted by the multiplexing transmission means at a time which precedes a transmission of the corresponding set of image data by at least a predetermined time period, the predetermined time period being defined as a time period which allows a digital broadcast reception apparatus which receives the digital broadcast to obtain the second image data identification information specifying a set of image data before starting to extract the image data; and

an audio correspondence table multiplexing unit for reading an audio correspondence table corresponding to a set

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of audio data and multiplexing the audio correspondence table such that the audio correspondence table will be transmitted by the multiplexing transmission means at a time which precedes a transmission of the corresponding set of audio data by at least a predetermined time period, the predetermined time period being defined as a time period which allows a digital broadcast reception apparatus which receives the digital broadcast to obtain the second audio identification information specifying a set of audio data before starting to extract the audio data.

24. A digital broadcasting apparatus which achieves simulated interaction using a digital broadcast, the digital broadcasting apparatus comprising:

image information storage means for storing a plurality of sets of image data, each of which has an image data identifier;

control information storage means for storing a plurality of sets of control information, each of which has a control information identifier, and each of which includes link destination information that shows a set of image data and a set of control information for a link destination for the sets of image data, the link destination information showing a combination of an image data identifier of the set of the image data for the link destination and a control information identifier for the set of control information;

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correspondence information storage means for storing
correspondence information showing correspondence between
the sets of image data and the sets of control information;
and

 multiplexing transmission means for repeatedly
transmitting a plurality of sets of the image data and a
plurality of the control information as a multiplexed
stream,

 wherein the multiplexing transmission means includes:
 a retrieval unit for retrieving a plurality of sets of
image data and corresponding sets of control information
shown in the correspondence information;

a multiplexing unit for successively multiplexing image data and control information retrieved by the retrieval unit, in doing so assigning and writing first image data identification information into the set of image data and control information identification information into the set of control information;

an image correspondence table generation unit for generating an image correspondence table for each set of image data, each correspondence table having identification information found from the image data identifier of the corresponding set of image data, each image correspondence table including second image data identification information specifying a corresponding set of image data and reproduction time information for the corresponding set of

image data; and

an image correspondence table multiplexing unit for reading an image correspondence table corresponding to a set of image data and multiplexing the image correspondence table such that the image correspondence table will be transmitted by the multiplexing transmission means at a time which precedes a transmission of the corresponding set of image data by at least a predetermined time period, the predetermined time period being defined as a time period which allows a digital broadcast reception apparatus which receives the digital broadcast to obtain the second image data identification information specifying a set of image data before starting to extract the image data.

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25. The digital broadcasting apparatus of Claim 24, wherein the image correspondence table generation unit includes:

a reproduction time calculation unit for calculating reproduction time information at which a set of image data corresponding to an image correspondence table is to be reproduced, in accordance with a predetermined equation; and

a reproduction time writing unit for writing the reproduction time information calculated by the reproduction time calculation unit into the image correspondence table.

26. A digital broadcasting apparatus which achieves simulated interaction using a digital broadcast, the digital

broadcasting apparatus comprising:

image information storage means for storing a plurality of sets of image data, each of which has an image data identifier;

control information storage means for storing a plurality of sets of control information, each of which has a control information identifier, and each of which includes link destination information that shows a set of image data and a set of control information for a link destination for the sets of image data, the link destination information showing a combination of an image data identifier of the set of the image data for the link destination and a control information identifier for the control information;

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correspondence information storage means for storing correspondence information showing correspondence between the sets of image data and the sets of control information; and

multiplexing transmission means for repeatedly transmitting a plurality of sets of the image data and a plurality of the control information as a multiplexed stream,

wherein the multiplexing transmission means includes:

a retrieval unit for retrieving a plurality of sets of image data and corresponding sets of control information shown in the correspondence information;

a multiplexing unit for successively multiplexing image data and control information retrieved by the retrieval unit, in doing so assigning and writing first image data identification information into the set of image data and control information identification information into the set of control information;

a module information generation unit for generating a set of module information for a plurality of sets of image data, the module information including second image data identification information for identifying each set of image data in the plurality of sets of image data; and

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a module information multiplexing unit for reading module information generated by the module information generation means and multiplexing the module information such that the module information will be transmitted by the multiplexing transmission means at a time which precedes a transmission of the sets of image data, which are identified by the second image data identification information in the module information, by at least a predetermined time period, the predetermined time period being defined as a time period which allows a digital broadcast reception apparatus which receives the digital broadcast to obtain the second image data identification information specifying a set of image data before starting to extract the corresponding set of image data.

Cancel claims 27-50.